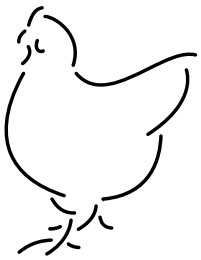
Statistical Model Reduces Chicken Giveaway



One would assume that a 4-pound value pack of chicken breast fillets bought in the local supermarket actually weighs 4 pounds. But it may weigh up to 13 percent more than that. This kind of overfill proves costly to poultry processors.

Food marketing changes in the United States have led to a shift from unit pricing to minimum-weight pricing (MWP) in some wholesale and retail situations. Under unit-pricing procedures, products are priced at a fixed price per unit, for example, 20 cents per ounce. Under MWP, products that meet weight minimums may be of varying sizes—but are priced at fixed rates. In MWP, it is sometimes necessary to fill containers beyond the stated weights in order to meet the weight minimum. Product above the stated weight is commonly designated as giveaway.

ARS food scientist Louis L. Young developed a statistical modeling approach to minimize the amount of overfill in prepackaged poultry products.

"During a visit to a poultry processing plant, I saw enormous variations," says Young. "Processors overfill bags to meet minimum weights. If a bag is short by 1 ounce, a whole breast fillet is needed to bring the bag into compliance."

Young simulated a scenario of packing 4-pound packages of chicken breast fillets. The bags contained from six to nine breast fillets. These pieces were presorted into six weight categories, or quantiles. The mean weights of the quantiles were 168, 209, 231, 248, 262, and 277 grams.

When the bags were assembled using breast fillets chosen from only two of the weight categories, greater variation occurred in the bag weights—up to 25 percent overfill was noted. For a 4-pound bag of chicken breast fillets, this means an extra pound given away by the wholesaler.

But when breast fillets were chosen from selected combinations of the six categories, there was much less variation from the 4-pound goal than when the fillets were randomly chosen. The amount of giveaway decreased to about 2.5 percent.

"The trick is to choose combinations of categories that minimize variation in overall package weights," contends Young.

The statistical model indicates that presizing the product and then packaging by specific numbers of pieces from each weight category may help reduce the amount of giveaway, a cost savings for wholesalers—especially of high-value products such as chicken breast fillets.

"This allows us to alter the process without having to alter technology," says Young.—By **Sharon Durham,** ARS.

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Biodiesel Jet Fuels

Cleaner, greener jet fuels made from formulas that contain part soybean oil could clean up the air and give added profits to the nation's 400,000 soybean growers.

Now that biodiesel fuel is being used in ground transportation, research efforts at the National Center for Agricultural Utilization Research in Peoria, Illinois, are helping lay the groundwork for new, winterized formulas of jet fuel blended with esters of soybean oil.

With winterization processing, biodiesel fuel can be safely blended with jet fuel used in commercial and military aircraft. ARS chemical engineer Robert O. Dunn found that small amounts of methyl soyate (SME)—esters from fatty acids of soybean oil—could be blended with jet fuel (JP-8) with little or no effect on aircraft operation, based on established jet fuel specifications.

Dunn has developed a three-step winterization process for biodiesel fuel that involves mixing in additives, chilling the fuel, and filtering out solids. In laboratory tests, researchers have produced biodiesel fuels capable of starting engines at temperatures as low as 5˚F, making them comparable to petroleum-based diesel fuels.

In laboratory tests, Dunn checked winterized blends having between 10 and 30 percent methyl soyate (SME) by volume to determine their compatibility with JP-8 and tested the fuels under cold temperatures. Using unwinterized biodiesel fuel blends could mean limiting the ability of aircraft to fly at high altitudes, where cold temperatures can cause crystal formation, which blocks fuel filters and plugs fuel lines.

"The most promising aspect of this work was finding that winterized SME did not form solid particles when exposed to a range of slightly below zero to –52˚F in the laboratory," says Dunn.

But eventually even winterized SME blends will form solid particles when the temperature is low enough. "Our work will continue to focus on expanding the lower limits of temperature so that winterized, blended biodiesel fuels can function safely in commercial and military aircraft," says Dunn.

Biodiesel fuel has been shown to reduce harmful exhaust emissions—particulate matter, volatile organic compounds, hydrocarbons, smoke, and carbon dioxide. Another plus: Biodiesel is nonflammable, making it relatively safe to store and handle. It's also biodegradable.—By **Linda McGraw,** ARS.

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